

# Mini Strip Heater System

## Duraline®



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**Description:**

The Duraline P114601-HP Mini PreHeat Heater System is a fully integrated electrical resistance heating solution designed for welding preheat, post-heat, and stress relief of alloy steels and other materials. Built with safety and durability at its core, the system exceeds OSHA standards and is housed in a rugged, weather-tight enclosure with water-tight connections throughout.

The panel supports up to 83,000 watts of total output at 480 volts, 3-phase. It can accommodate as many as 80 1kW heaters, depending on configuration, and is suitable for heating materials between ½” and 7” thick. Under standard field conditions, the system can achieve and maintain welding temperatures of up to 600°F.

The system includes the controller, secondary distribution, and heaters. Users only need to provide a compatible input cable. The panel connects to a 480V, 3-phase power source with a minimum current rating of 100 amps. All components are optimized for current capacity, safety, and portability—designed for easy handling by two people. Water-tight integrity is maintained throughout the system, from controller to heater connection.

**Controller:**

Duraline Part No. P114601-HP

Input: Up to 480 volts, 3-phase, 3-pole, 4-wire, 100 amperes

The controller is housed in a durable, weather-tight enclosure and designed for industrial environments. It features a 100 amp, 600-volt, 3-pole contactor unit that supplies power to (4) Duraline 4RJ20 3-pole, 4-wire receptacles with snap-back weatherproof covers. Each receptacle is protected with glow-indicating fuses—one per phase—for reliable overload protection.

A step-down transformer (480V to 120V) supplies power to the control circuit. Heat control is managed by an integrated percentage timer, adjustable from 0 to 100%, allowing precise regulation of heating cycles. For example, a 25% setting keeps the contactor closed for 15 seconds and open for 45 seconds per minute.

The front panel includes a power Off/On switch and two pilot indicator lights:

- Power On
- Heaters Energized

All indicators and controls are located on the same side of the cabinet, making it easy for supervisory personnel to monitor system status and fuse integrity at a glance.

### **Installation of the Mini System:**

Duraline heaters are resistance elements which depend upon firm contact to the part for heat transfer. The cleaner the surface, the better the heat transfer. Therefore, rust, mill scale, paint, grease, etc., should be removed when possible.

### **Mounting of Heater:**

Stud welding is the most widely used method of attaching heaters. A Capacitor Discharge stud welding unit is best suited for this application. This unit will give enough strength to secure your heater, with very shallow penetration, so that the studs may be easily removed after the heating cycle is complete.

Strapping, banding, and clamping may also be used, but care should be taken to ensure a good strong contact between the surfaces of the heater and the workpiece.

On flat surfaces, the heater may be held down by a suitable weight. The pre-heater with aluminum shoe may be just laid on a flat surface for low temperature heating.

Regardless of which method is used, the heater must be mounted 2–3” away from the weld zone.

### **Stud Mounting:**

The heater cover is manufactured with elongated mounting holes at regular intervals. One stud or nail should be used per hole. On flat surfaces, the heater should be “snugged down”. After the system has been energized for about 15 minutes, all the units should be re-checked for tightness.

On curved or irregular surfaces, connect the heater on the junction box end first, then bend the heater and shoe to the desired shape. Tighten the remaining studs. After the system has been energized for about 30 minutes, tap the cover with a leather or rubber mallet to ensure good contact with the surface and re-tighten all the studs.

### **Note:**

If the heater and shoe cannot be bent to fit the surface when cold, energize the heater for a few minutes; it should then bend easily.

### **Power Streamer Taps:**

Duraline Part No. M114700(6 Output Plugs) & M114709 (9 Output Plugs)

The power streamer is an all-molded distribution line. The main cable is #12/4 conductor type SOOW, 600-volt portable cord. The input plug is molded directly to the cable. Taps are molded on 3-foot centers. Each tap has 6 feet of #14/3 SOOW 105°C, 600-volt portable cord and is terminated in an integrally molded 3-pole female plug. The taps are connected to the main cable on a staggered phase arrangement so that a balanced 3-phase load is maintained.

### **Suggested Strip Heaters:**

Duraline Part No. 364602000-131B-14B15

The standard strip heater used with the P114601-HP system is a 36" 2000-watt heater, embedded into an efficient aluminum conductive shoe and reflective cover. A special attachment is used so that a male plug is attached directly to the heater assembly.

While the system is designed for 36" heaters, it may also be used to power 12", 18", and 24" heaters of various wattage levels

### **Strip Heaters Part Number:**

#### **Part Number Description**

12460500-131B-14B15

Non-Thermostatic 12" Strip Heater – 500 Watts with 15MP3 male plug

12460650-131B-14B15

Non-Thermostatic 12" Strip Heater – 650 Watts with 15MP3 male plug

184601000-131B-14B15

Non-Thermostatic 18" Strip Heater – 1000 Watts with 15MP3 male plug

244601000-131B-14B15

Non-Thermostatic 24" Strip Heater – 1000 Watts with 15MP3 male plug

244601500-131B-14B15

Non-Thermostatic 24" Strip Heater – 1500 Watts with 15MP3 male plug

364602000-131B-14B15

Non-Thermostatic 36" Strip Heater – 2000 Watts with 15MP3 male plug

364602500-131B-14B15

Non-Thermostatic 36" Strip Heater – 2500 Watts with 15MP3 male plug

### **Banding or Strapping:**

Steel bands or straps such as those used for crates may be used to hold the heaters in place (1/2" or wider). The band should cover the mounting holes that are in the cover assembly. One band should be used per hole so that all the mounting holes are covered.

The band should be as tight as possible to ensure good contact between the heater and the work. After the system has been energized for 15 to 20 minutes, the bands should be checked for tightness. If the bands have loosened, a suitable wedge can be used to tighten them.

### **"C" Type Clamps:**

When using heaters close to an edge, "C" clamps may be used to secure them in place. A clamp should be placed directly over each mounting hole. The clamp should hold the heater tightly against the surface to be heated. After the system has been energized for 15 or 20 minutes, the clamps should be checked for tightness.

### **Connecting Power Streamer to Heaters:**

After the heaters have been mounted, they should be plugged into the power streamer. Care should be taken to ensure that the plugs are fully engaged and that there is no separation between the plug and the receptacle. Once the heaters have been plugged in, the streamer cables should be laid out as far from the heaters as possible.

### **Controller Timer:**

The controller is the heart of the Duraline Mini system. It controls the heat input into the work by turning the system on and off. The timer is set on a desired percentage of a minute.

For example, a 10% setting would mean that the system would be on for 6 seconds and off for 54 seconds.

There is a pilot light that indicates power is available and a second light which indicates the heaters are energized.

### **Approximate Timer Setting:**

The timer setting will depend on many things, such as:

1. Temperature desired
2. Thickness of the metal
3. Heat losses due to wind, drafts, etc.

As a rule of thumb, the system should be started at 50% for pre-heating. Appropriate adjustments will have to be made to reach and maintain the desired temperature. Therefore, until the system has stabilized, it is necessary to check the work every 10 minutes or so.

### **Use of the Controller:**

The Mini controller can be used to control up to 4 power streamers simultaneously. Once the streamers are plugged in, the following procedure should be followed:

1. Turn on main disconnect to controller.
2. Set percentage timer to 50%.
3. Turn controller on. You should get a power-on indicating light immediately. Within 30 seconds maximum you should have a heater-on light.
  - a. If any Fused Light above a receptacle is on, that indicates a mission or blown fuse on that receptacle
4. After 10 minutes check temperature of weldment. If rate of heating is too slow, raise timer.
5. Check weldment temperature periodically. When desired temperature is reached, reduce timer to  $\frac{1}{2}$  its setting.
6. Check weldment about 5 minutes later. If temperature is still rising, decrease timer. If temperature is falling, increase timer setting.

### **Replacing Fuses in the Container Assembly**

1. Disconnect power from unit.
2. Rotate Fuse Holder cap counterclockwise until fuse and cap pop out of panel
3. remove and test fuse for continuity
4. Replace the old fuse with new KLD-30 fuse (Duraline P/N 008145) by pushing fuse into fuse cap. **USE ONLY KLD-30 FUSES**
5. Screw fuse and cap clockwise into fuse holder until no gap is visible
6. Reconnect power to the Controller. The fuse indicating light should no longer be illuminated

### **General Precautions:**

1. Be sure the system is connected to 480V, 3-phase supply of 100 amperes Maximum capacity.
2. Have work as clean as possible.
3. Secure heaters tight to the work.
4. Shield work against wind, breezes, drafts, etc.
5. Set the percentage timer.

### **Special Cautions:**

A. The system has an excellent integral ground that is continuous from the P114601-HP Control Panel to the strip heaters. Care must be taken that the P114601-HP Panel has an external lug, which must have cable attached to it and running to a grounding rod or other appropriate means of good grounding practices. Care must be taken that the welding return offers a better path, otherwise the welding current will use the heater grounding system. This will result in a failure in the controller wiring. All welding grounds should be clean and tightly secured to the work. The welding cable and any connectors used (lugs or other type) should be in good, clean condition.

B. PRIMARY VOLTAGE SHOULD NEVER EXCEED 480 VOLTS AT  $\pm 5\%$

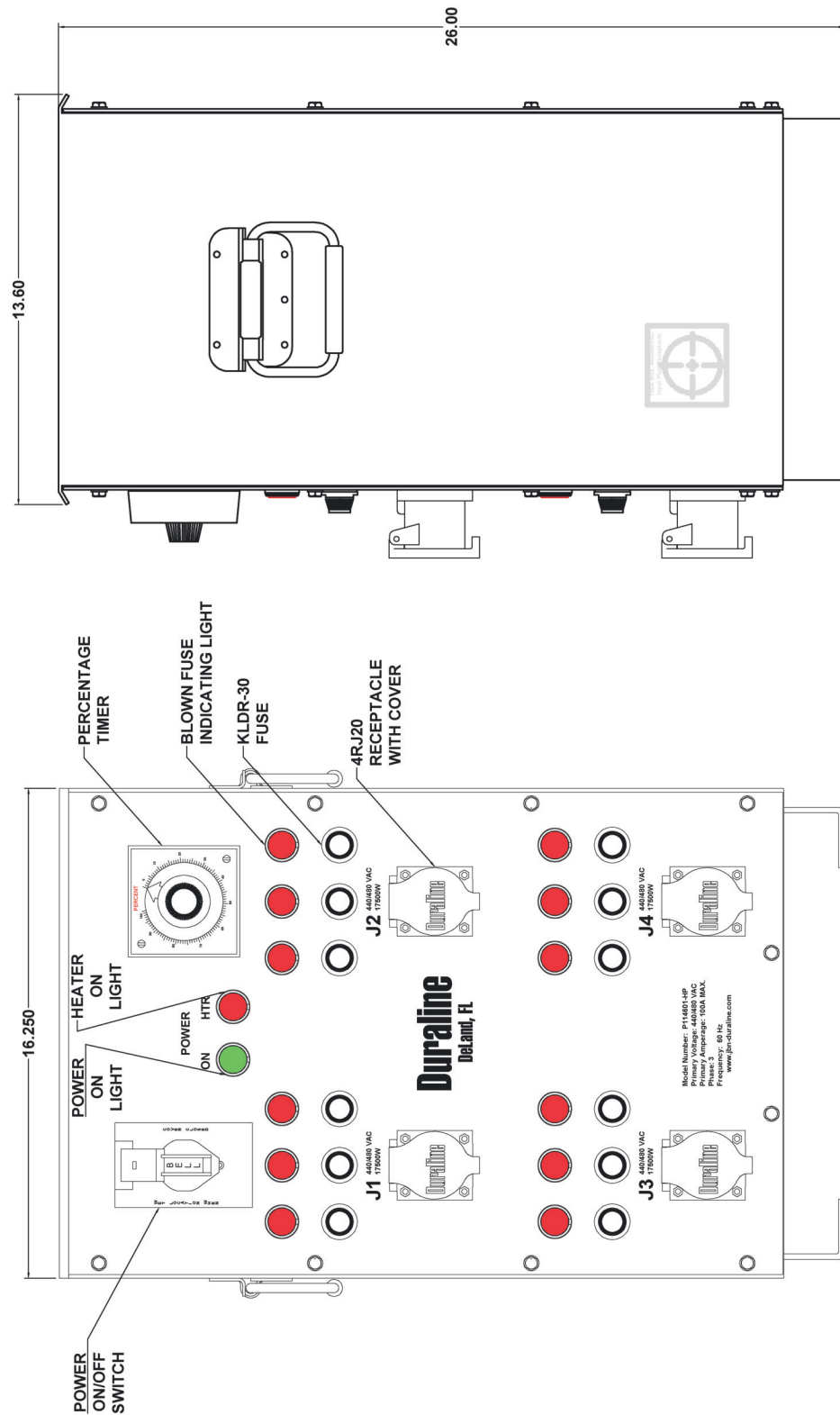
C. When replacing fuse, only KLDR-30 (Duraline P/N 008145) fuses must be used.

D. Care must be taken to ensure the heater plugs are fully seated in the receptacles.

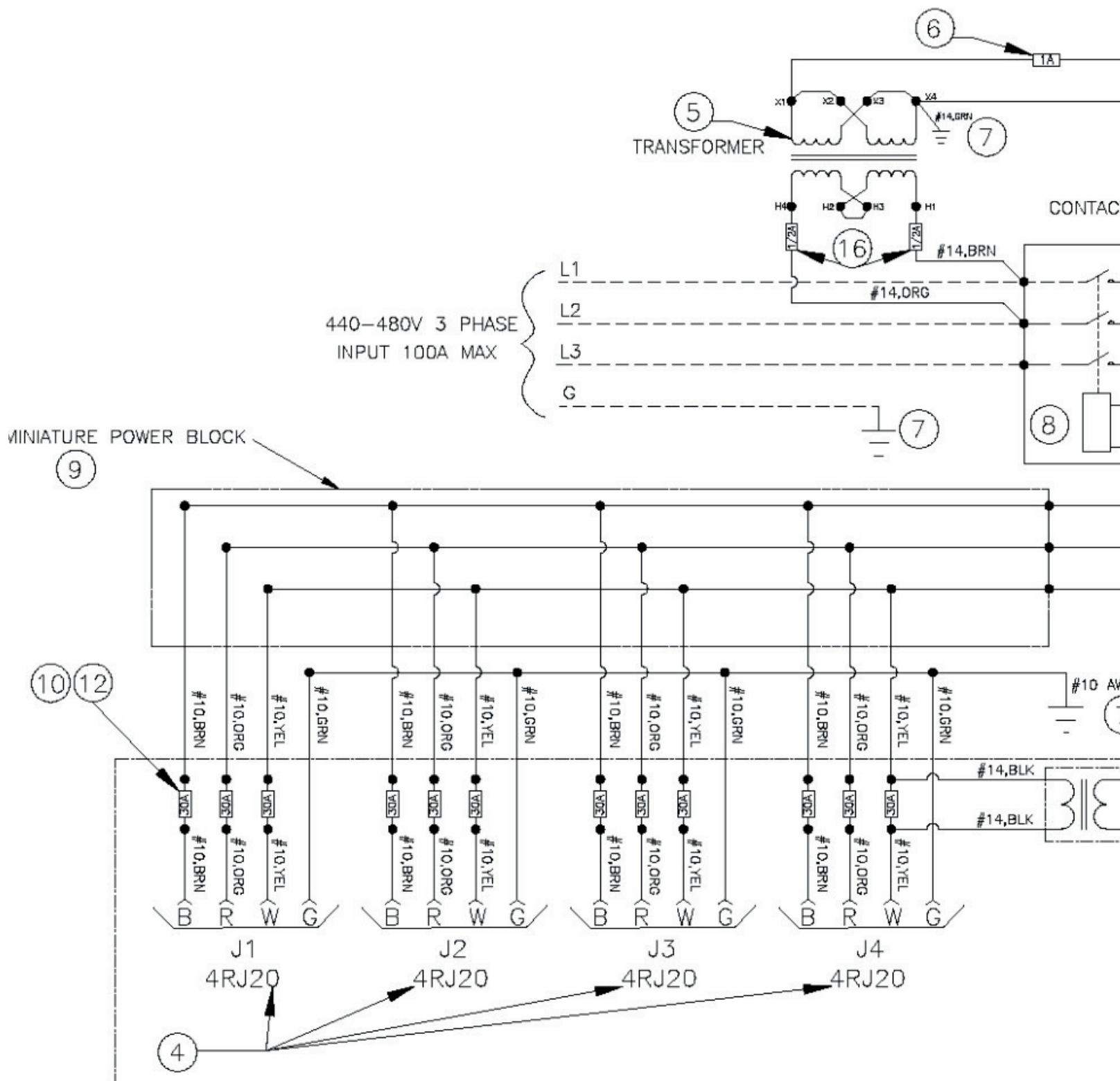
### **Power Details:**

- **With Input of 440 Volt 3 phase**
  - 76,000 Watt total
  - 19,000 Watt per outlet
  - 25 Amps per outlet
- **With Input of 460 Volt 3 phase**
  - 79,000 Watt total
  - 19,750 Watt per outlet
  - 25 Amps per outlet
- **With Input of 480 Volt 3 phase**
  - 83,000 Watt total
  - 20,750 Watt per outlet
  - 25 Amps per outlet

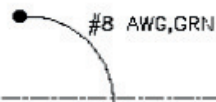
# Layout of Contactor - Controller



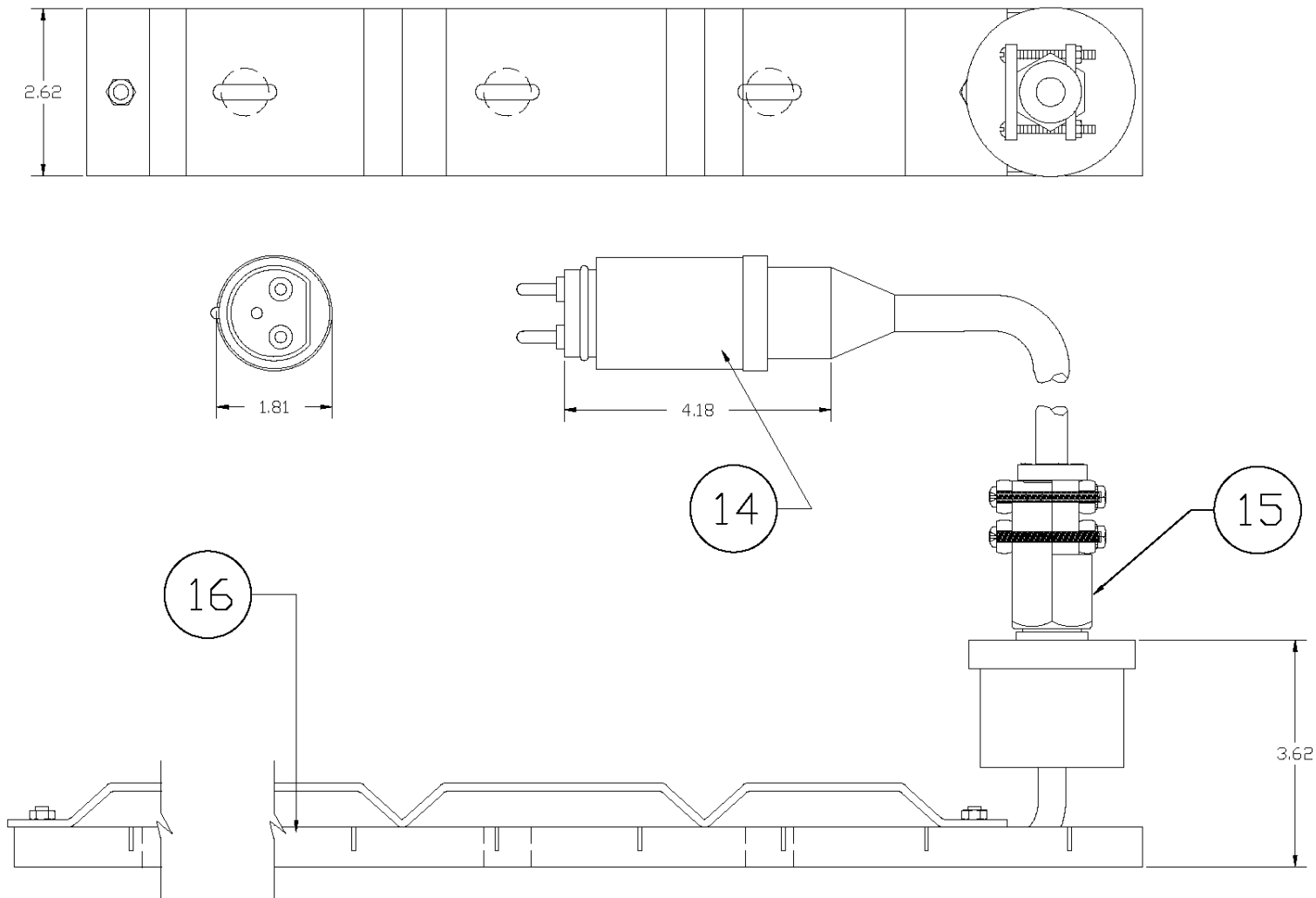
# Schematic for Controller



QTY.	PART No.	DESCRIPTION	ITEM
24	008158	QUICK DISCONNECT BLUE	18
24	008157	QUICK STACKED DISCONNECT YELLOW	17
2	008155	TIME DELAY FUSE 1/2A	16
1	008152	POWER ON LIGHT, GREEN	15
1	008151	HEATERS ON LIGHT, RED	14
12	008150	PILOT LIGHT, RED	13
12	008145	CLASS CC FUSE 30A	12
1	008144	VARISTOR	11
12	008143	FUSE HOLDER WATERTIGHT SNAP MOUNT	10

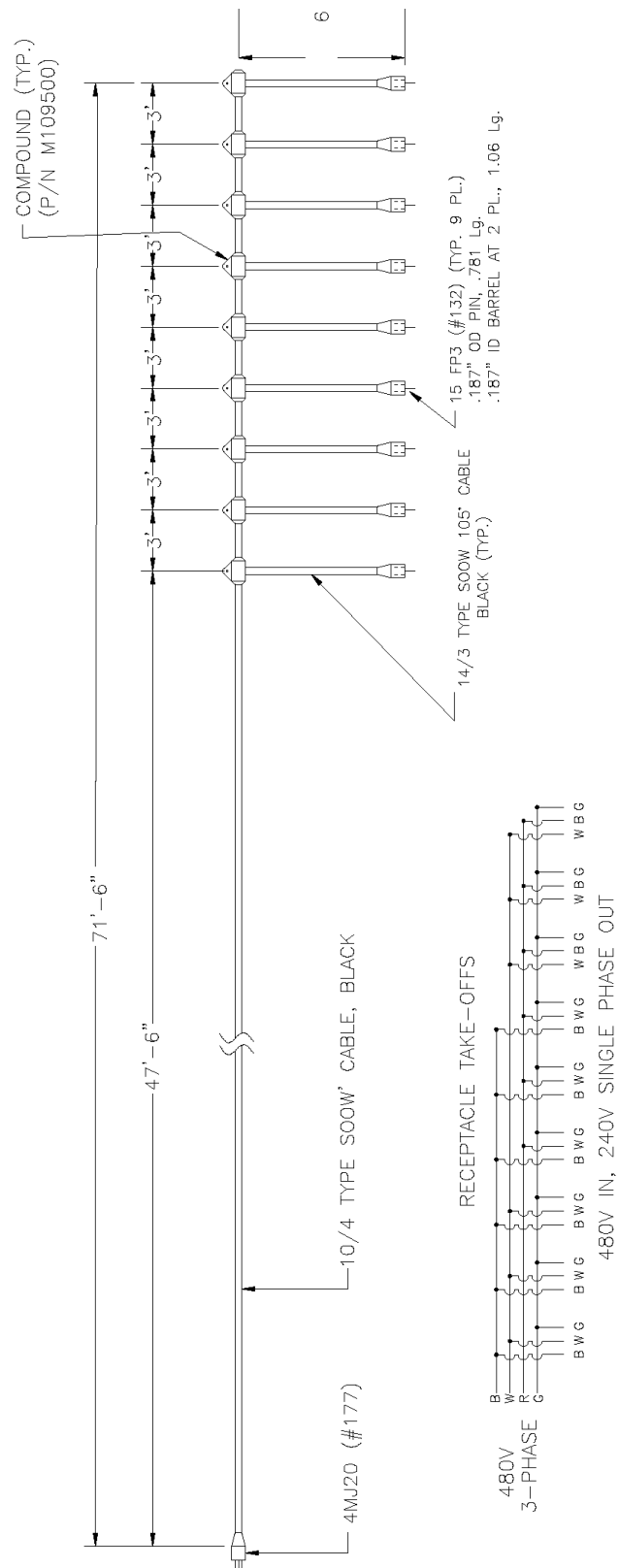
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# Strip Heater Assembly Layout



<u>REF #</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
14	1	3-POLE MALE PLUG
15	1	STRAIN RELIEF ASSEMBLY
16	1	STRIP HEATER

# Power Streamer Layout



# Trouble Shooting Chart

**Because of its simple design and rugged construction, the Mini System will provide many hours of trouble-free operation. If a problem does occur, it will be easy to locate and remedy. The following are problems which could arise:**

## **Problem:**

**No power out of controller.**

### **Action:**

1. Check main breaker or main fuse disconnect.
2. Check off/on switch on controller.
3. Check input power leads.
4. Check controller transformer for 120 volts output.

**No power to heaters but power light on and heater light off.**

### **Action:**

1. Check that percentage timer is past the zero setting.
2. Check for faulty percentage timer.

**No power to heaters but power light on and heater light on.**

### **Action:**

1. Check contactor holding coil.
2. Check contactor.

**2/3 of the heaters in the system not heating.**

### **Action:**

1. Check main disconnect for blown fuse.
2. Check input power cable for open in one phase.
3. Check contactor for failure of one pole.

**All heaters on a power streamer not heating.**

### **Action:**

1. Check that streamer plug is fully inserted into receptacle.
2. Check streamer for open plug.
3. Check receptacle.

## **Problem:**

### **2/3 of the heaters on a streamer not heating.**

#### **Action:**

1. Check for blown fuse at the receptacle.
2. Check power streamer for open lead.
3. Check receptacle.

### **Isolated heater not heating.**

#### **Action:**

1. Check assembly for open. If open:
  - a. Remove heater cover and check heater for continuity; if not open.
  - b. Check plug for open.
  - c. Check streamer tap for open.

### **H. Heaters are warm, but work will not come up to temperature.**

#### **Action:**

1. Check percentage timer. Increase if possible.
2. Check heater contact with the work.
3. Check for wind, breeze, or drafts across work. If present, screen off work area.
4. Check primary voltage for low voltage condition.

### **Heater failing at random.**

#### **Action:**

1. Check primary voltage. Should not exceed 480 volts  $\pm$  5%.
2. Heater too close to welding.

### **Fuse holders blowing out of containers.**

#### **Action:**

1. Wrong replacement fuses being used. Replacement fuses must be KLDR-30 Fuses (Duraline P/N 008145)

### **Heater plugs getting hot.**

#### **Action:**

1. Check seating of male plug in power streamer receptacle.

### **No Power out of NEMA 5-15 Outlet, power light is illuminated.\***

#### **Action:**

1. Check outlet press reset
2. Disconnect Panel from power
3. Remove rear panel and check 15A fuse

\*For P114601-HP-5-15 models

# Recommended Parts List

## Strip Heaters and Power Streamer

Part Number	Part Description
12460500-131B-14B15	Non-Thermostatic 12" Strip Heater – 500 Watts*
12460650-131B-14B15	Non-Thermostatic 12" Strip Heater – 650 Watts*
184601000-131B-14B15	Non-Thermostatic 18" Strip Heater – 1000 Watts*
244601000-131B-14B15	Non-Thermostatic 24" Strip Heater – 1000 Watts*
244601500-131B-14B15	Non-Thermostatic 24" Strip Heater – 1500 Watts*
364602000-131B-14B15	Non-Thermostatic 36" Strip Heater – 2000 Watts*
364602500-131B-14B15	Non-Thermostatic 36" Strip Heater – 2500 Watts*
M114700	Duraline 6-Tap Power Streamer 4MJ20 to 15FP3
M114709	Duraline 9-Tap Power Streamer 4MJ20 to 15FP3

\*Listed Thermostatic Heaters Come Pre-Assembled with 15MP3 Male Plugs

## Replacement Parts

Part Number	Part Description
008145	Fuse - KLDR-30 30A, 600V
008143	Fuse Holder
007793	On-Off Switch - 20 Ampere
008150	Red, Fuse Indicating Light
008151	Red, Heaters On Indicating Light
008152	Green, Power On Indicating Light
007799	Percentage Timer, 60 Second Time Range Standard
M117900-BLK	Duraline 4RJ20 Receptacle
A003008	4RJ20 Snap Back Cover Assembly
007807	Replacement Contactor

To order additional parts or request custom fittings, please contact our sales support team at 386-873-2990



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